6th Quarterly Report – Public Page

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Contract Number: *DTPH56-06-T-000019*

Prepared for: *DOT PHMSA*

Project Title: *Augmenting MFL Tools with Sensors That Assess Coating Condition*

Prepared by: *Battelle and FBS Inc.*

Contact Information: *J. Bruce Nestleroth; nestlero@battelle.org; 614-424-3181*

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Progress to date:

The goal of this project is to add sensors for coating assessment to a typical in-line inspection tool. These sensors will help pipeline owners assess the general health of the external coating that is protecting their pipeline system. External coatings are routinely used to protect transmission pipelines from corrosion; however, these coatings degrade over time and can be damaged by outside forces including earth movement and excavation equipment. To detect metal loss corrosion defects, transmission pipeline operators often inspect their pipelines with magnetic flux leakage (MFL) in-line inspection tools. While most defects detected are benign to the operation of the pipeline, the few metal loss defects that affect the integrity of the pipeline remain a concern. Unfortunately, MFL corrosion surveys only find the result of the problem (corrosion), not the source of the problem (coating failure). Stress corrosion cracks (SCC), which occur at coating disbonds, can be detected using ultrasonic in-line inspection technology. Unfortunately, the cost to inspect for SCC is high, and inspections are usually conducted on pipelines with a higher probability of cracking based on soil models, cathodic protection assessment, bellhole inspections, and related data. Accurate detection of disbonded coating can help to indicate future conditions that may lead to the corrosion of the pipeline. The sensors that will be developed on this project would not add substantial cost or complexity to a normal MFL survey. The technology could help justify reinspection intervals based on the fact that the corrosion threat has been properly addressed (MFL in-line inspection) and the threat mitigation method (the coating) has been verified.

In this sixth quarter, we have tested the sensor under simulated pipeline conditions. A wheeled vehicle was built for pull testing and sensors were mounted and adjusted for use in pull tests at the pipeline simulation facility (PSF). The vehicle was pulled through four pipes using a tow winch with a variable speed controller at speeds ranging from 0.3 mph to approximately 1 mph. The consistent results from the bare pipe showed that acquiring data on the fly was possible and that the signal features are similar to stationary tests. Disbonds and missing coating were detectable in tar type coatings, though some coatings caused severe attenuation. A second pair of sensors may be necessary for large diameter pipe with more attenuative coating types.